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How to Use this Guide

Your guide to the Wireless-G Range Expander has been designed to make understanding networking with the Range Expander easier than ever. Look for the following items when reading this User Guide:

This checkmark means there is a note of interest and is something you should pay special attention to while using the Range Expander.

This exclamation point means there is a caution or warning and is something that could damage your property or the Range Expander.

This question mark provides you with a reminder about something you might need to do while using the Range Expander.

In addition to these symbols, there are definitions for technical terms that are presented like this:

word: *definition.*

Also, each figure (diagram, screenshot, or other image) is provided with a figure number and description, like this:

Figure 0-1: Sample Figure Description

Figure numbers and descriptions can also be found in the "List of Figures" section.

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Chapter 1: Introduction

Welcome

Thank you for choosing the Wireless-G Range Expander. This Range Expander will allow you to expand your network beyond the range of your current access point or wireless router.

How does the Range Expander do this? Once on your network, the Range Expander repeats the signal to all devices within its range. By placing the Range Expander at the furthest edge of your access point or wireless router's signal, it could conceivably double the area of your network.

But what does all of this mean?

Networks are useful tools for sharing computer resources. You can access one printer from different computers and access data located on another computer's hard drive. Networks are even used for playing multiplayer video games. So, networks are not only useful in homes and offices, they can also be fun.

PCs equipped with wireless cards and adapters can communicate without cumbersome cables. By sharing the same wireless settings, within their transmission radius, they form a wireless network. While access points and wireless routers bridge wireless networks and wired networks, the Range Expander can then take that signal for networks that use the 802.11b and 802.11g standards and extend it beyond its current range.

Use the instructions in this Guide to help you connect the Range Expander, set it up, and configure it to expand the range of your Wireless-B and Wireless-B networks. These instructions should be all you need to get the most out of the Range Expander.

access point *- a device that allows wireless-equipped computers and other devices to communicate with a wired network. Also used to expand the range of a wireless network.*

network *- a series of computers or devices connected for the purpose of data sharing, storage, and/or transmission between users.*

router *- a networking device that connects multiple networks together.*

adapter *- a device that adds network functionality to your PC.*

802.11b *- an IEEE wireless networking standard that specifies a maximum data transfer rate of 11Mbps and an operating frequency of 2.4GHz.*

802.11g *- an IEEE wireless networking standard that specifies a maximum data transfer rate of 54Mbps, an operating frequency of 2.4GHz, and backward compatibility with 802.11b devices.*

What's in this Guide?

This user guide covers the steps for setting up and using the Wireless-G Range Expander.

- Chapter 1: Introduction
  This chapter describes the Range Expander's applications and this User Guide.

- Chapter 2: Planning Your Wireless Network
  This chapter discusses a few of the basics about wireless networking.

- Chapter 3: Getting to Know the Wireless-G Range Expander
  This chapter describes the physical features of the Range Expander.

- Chapter 4: Connecting the Wireless-G Range Expander
  This chapter describes the steps for connecting the Range Expander to your wireless network.

- Chapter 5: Setting up the Wireless-G Range Expander
  This chapter instructs you on how to use the Range Expander's Setup Wizard and configure the Range Expander.

- Chapter 6: Configuring the Wireless-G Range Expander
  This chapter show you how to configure the Range Expander with the Web Utility.

- Appendix A: Troubleshooting
  This appendix describes some potential problems and solutions, as well as frequently asked questions, regarding installation and use of the Adapter.

- Appendix B: Wireless Security
  This appendix discusses security issues regarding wireless networking and measures you can take to help protect your wireless network.

- Appendix C: Windows Help
  This appendix describes how you can use Windows Help for instructions about networking, such as installing the TCP/IP protocol.

- Appendix D: Glossary
  This appendix gives a brief glossary of terms frequently used in networking.

- Appendix E: Specifications
  This appendix provides the Range Expander's technical specifications.

- Appendix F: Warranty Information
  This appendix supplies the Range Expander's warranty information.
- Appendix G: Regulatory Information
  This appendix supplies the Range Expander's regulatory information.
- Appendix H: Contact Information
  This appendix provides contact information for a variety of Linksys resources, including Technical Support.

Chapter 2: Planning your Wireless Network

Network Topology

***topology**: the physical layout of a network*

A wireless network is a group of computers, each equipped with one wireless adapter. Computers in a wireless network must be configured to share the same radio channel. Several PCs equipped with wireless cards or adapters can communicate with one another to form an ad-hoc network.

***ad-hoc**: a group of wireless devices communicating directly with each other (peer-to-peer) without the use of an access point.*

Linksys wireless adapters also provide users access to a wired network when using an access point or wireless router. An integrated wireless and wired network is called an infrastructure network. Each wireless PC in an infrastructure network can talk to any computer in a wired network infrastructure via the access point or wireless router.

***infrastructure**: a wireless network that is bridged to a wired network via an access point.*

An infrastructure configuration extends the accessibility of a wireless PC to a wired network, and can double the effective wireless transmission range for two wireless adapter PCs. Since an access point is able to forward data within a network, the effective transmission range in an infrastructure network can be doubled.

Roaming

***roaming**: the ability to take a wireless device from one access point's range to another without losing the connection.*

Infrastructure mode also supports roaming capabilities for mobile users. Roaming means that you can move your wireless PC within your network and the access points will pick up the wireless PC's signal, providing that they both share the same channel and SSID.

***SSID**: your wireless network's name.*

Should you consider roaming, choose a feasible radio channel and optimum access point position. Proper access point positioning combined with a clear radio signal will greatly enhance performance.

Network Layout

Linksys wireless access points and wireless routers have been designed for use with 802.11b, and 802.11g products. With 802.11g products communicating with the 802.11b standard and some products incorporating both “a” and “g”, products using these standards can communicate with each other.

Access points and wireless routers are compatible with 802.11b and 802.11g adapters, such at the PC Cards for your laptop computers, PCI Card for your desktop PC, and USB Adapters for when you want to enjoy USB connectivity. Wireless products will also communicate with the wireless PrintServer.

When you wish to connect your wired network with your wireless network, network ports on access points and wireless routers can be connected to any of Linksys's switches or routers.

With these, and many other, Linksys products, your networking options are limitless. Go to the Linksys website at www.linksys.com for more information about wireless products.

Chapter 3: Getting to Know the Wireless-G Range Expander

The Front Panel

The Range Expander's LEDs, where information about network activity is displayed, are located on the front panel. In addition, the Range Expander's antenna is adjustable and located on the front panel. Make sure the antenna is positioned straight up into the air, however the Range Expander is positioned.

Power — *Blue/Red*. The **Power** LED lights up when the Range Expander is powered on. This light will appear blue when the Range Expander has connected to a functioning network. When there is no network with which to connect, this light will appear red.

Link — *Blue*. The Link LED lights whenever there is a successful wireless connection and will flash when there is network activity.

Figure 3-1: The Front Panel

The Side Panel

On the Range Expander's side panel, you will find the Reset and Auto configuration buttons.

wep *- a method of encrypting network data transmitted on a wireless network for greater security.*

Auto configuration — The **Auto configuration** button can be used to easily connect the Range Expander to the nearest wireless network, via an access point or wireless router. Simply connect the power and press the **Auto configuration** button. Your wireless network must have WEP disabled for this feature to function.

Reset Button — There are two ways to reset the Range Expander's factory defaults. Either press the **Reset Button**, for approximately ten seconds, or restore the defaults from the Password tab in the Range Expander's Web-Based Utility.

Important: Resetting the Range Expander will erase all of your settings (WEP Encryption and Wireless settings, etc.) and replace them with the factory defaults. Do not reset the Range Expander if you want to retain these settings.

The Power Plate

The back of the Range Expander has a recess where its power plates can be connected. Two power plates come with the Range Expander, one with two prongs for connecting directly to a power outlet, and another with a cord to reach a power outlet.

These power plates are slid into the recess and are fully connected when the orange tab snaps into place. To remove the power plate, slide the tab to the right and slide out the power plate. Always unplug the Range Expander before removing the power plate.

Figure 3-2: The Power Plate with Cord

Figure 3-3: The Two-Prong Power Plate

Chapter 4: Connecting the Wireless-G Range Expander

Since the Range Expander does not physically connect to your network, through cables, etc., connection is very simple.

1. Locate an optimum location for the Range Expander. The best placement is usually at the edge of your wireless network.
2. Fix the direction of the antenna. Try to place it in a position that will best cover your wireless network. Normally, the higher you place the Range Expander's antenna, the better the performance will be. The antenna's position enhances the receiving sensitivity.
3. Connect the appropriate power plate and connect it to a power outlet. You should always plug your networking gear into a surge protector.
4. If you would like to use the Range Expander's Auto configuration button, disable your wireless network's WEP security setting. Then, press the **Auto configuration** button. It will then automatically detect your wireless network and configure itself with those settings. Once this is done, you can once again enable WEP security.

   If you would rather configure the Range Expander with the Setup Wizard included, you can leave WEP security in place. WEP Security should always be enabled.

Now that the hardware installation is complete, proceed to Chapter 5: Setting Up the Wireless-G Range Expander, for directions on how to set up the Range Expander with the Setup Wizard.

tcp/ip: *a set of instructions PCs use to communicate over a network.*

HAVE YOU: Enabled TCP/IP on your PCs? PCs communicate over the network with this protocol. Refer to Appendix D: Windows Help for more information on TCP/IP.

hardware: *the physical aspect of computers, telecommunications, and other information technology devices.*

NOTE: The Auto configuration button can be used to setup the Range Expander simply when you have disabled WEP security on your wireless network.

Wall Mounting

For more convenient placement, the Range Expander can be positioned/mounted on any wall. There are two ways to do this.

With the Power Plate with Cord. Use the Wall Mounting Kit included with the Range Expander

With the Two-Pronged Power Plate. Wall-mounting can be achieved simply by plugging the Range Expander into a socket.

You should always plug your networking gear into a surge protector.

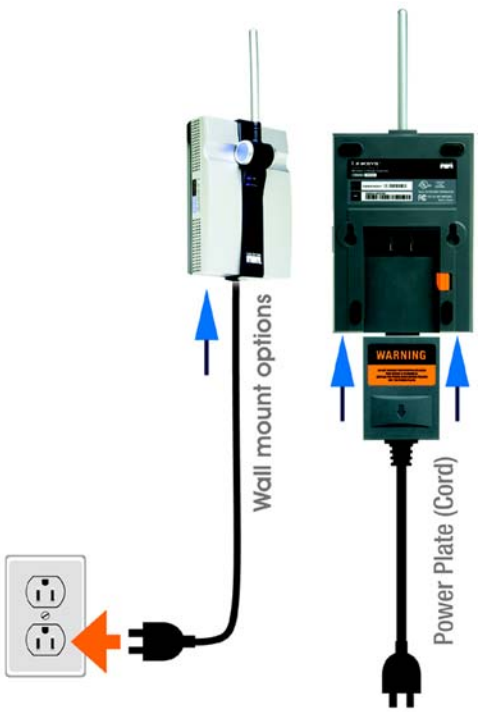

Figure 4-1: Wall-mounting the Range Expander with the Power Plate with Cord

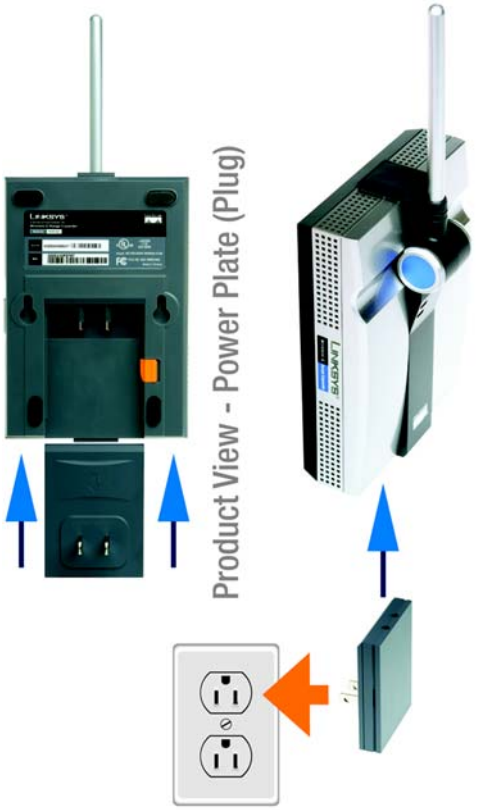

Figure 4-2: Wall-mounting the Range Expander with the Two-Prong Power Plate

Chapter 5: Setting Up the Wireless-G Range Expander

Now that you've placed the Range Expander within your wireless network, you are ready to begin setting it up. This Setup Wizard will take you through all the steps necessary to configure the Range Expander.

1. Insert the Setup Wizard CD into your PC's CD-ROM drive. Your PC must be communicating with your wireless network to set up the Range Expander.

2. The Setup Wizard's Welcome screen should appear on your monitor. If it does not, this means the Setup Wizard is not automatically running as it should. Start the Setup Wizard manually by clicking the **Start** button, selecting **Run**, and typing **d:\setup.exe** (where "D" is your PC's CD-ROM drive). Click the **Setup** button to continue this Setup Wizard. Clicking the **User Guide** button opened this Guide. To exit this Setup Wizard, click the **Exit** button.

NOTE: You won't need to use the Setup Wizard, if you set up the Range Expander with the Auto configuration button. The Auto configuration button can be used to setup the Range Expander simply when you have disabled WEP security on your wireless network.

Figure 5-1: The Setup Wizard's Welcome screen

3. The next screen advises you to have your PC communicating with your wireless network before starting the setup process. The Range Expander does not yet require connection. You should always connect your networking gear to a surge protector. Click the **Next** button to continue or **Exit** to exit the Setup Wizard.

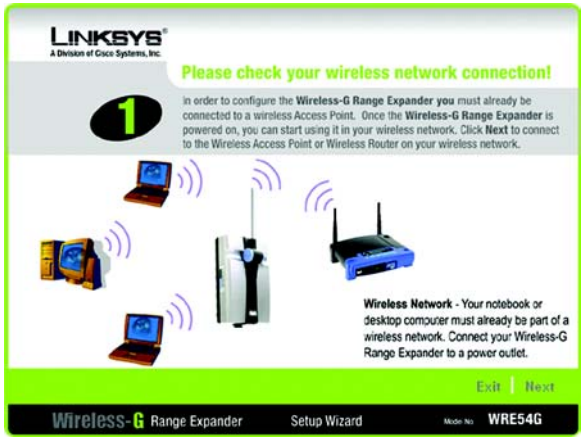
LINKSYS
A Division of Cisco Systems, Inc.
Please check your wireless network connection!
1
in order to configure the Wireless-G Range Expander you must already be connected to a wireless Access Point. Once the Wireless-G Range Expander is powered on, you can start using it in your wireless network. Click Next to connect to the Wireless Access Point or Wireless Router on your wireless network.
Wireless Network - Your notebook or desktop computer must already be part of a wireless network. Connect your Wireless-G Range Expander to a power outlet.
Exit
Next
Wireless-G Range Expander
Setup Wizard
Model No. WRE54G

Figure 5-2: Connecting to an access point

4. The Setup Wizard will run a search for your wireless network. If found, you will be asked to confirm the settings. If you confirm them, proceed to Step 5. If you'd like to chose a different access point for the Range Expander to communicate with, continue to Step 4b below. If no wireless network is found, click **Continue** and a list with the status information for each access point will be displayed.

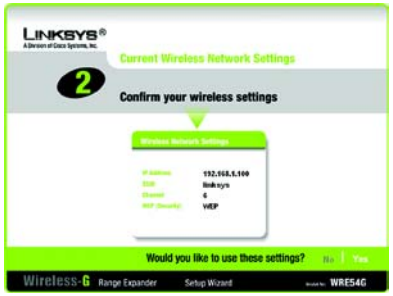

Figure 5-3: Confirm Wireless Settings

Figure 5-4: Cannot find Wireless Network

   a. A screen will notify you when no access point is detected on your network. Click **Continue** to survey your network for any access points or wireless routers or **Cancel** to exit the Setup Wizard.

   b. The site survey results will display all available access points and wireless routers in your network. Select the one to which you wish to connect from the list shown. Then, click **Yes** to continue or **No** to return to the beginning of the Setup Wizard.

Figure 5-5: Choose an access point

c. The Security Settings screen will appear next. From this screen, you can set the level of encryption on your network, along with entering the appropriate passphrases and/or encryption keys.

If your network's WEP encryption uses a passphrase, enter it here. The passphrase can consist of no more than 16 alphanumeric characters.

When entering the WEP key directly, it should be no more than 10 hexadecimal characters in length for 64-bit encryption or 26 hexadecimal characters in length for 128-bit encryption. Hexadecimal characters are the letters "A" through "F" and the numbers "0" through "9". All points in your wireless network must use the same WEP key to utilize WEP encryption.

Click the **Next** button to continue or **Exit** to exit the Setup Wizard.

Figure 5-6: The Security Settings screen

5. Now that the Setup Wizard has found an access point or wireless router with which to communicate, it will now search for the Range Expander. Select the one to which you wish to connect from the list shown. Then, click **Yes** to continue or **No** to return to the beginning of the Setup Wizard.

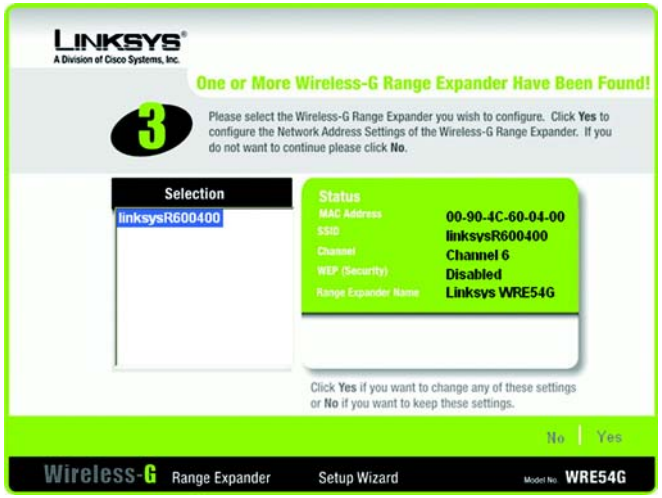
LINKSYS
A Division of Cisco Systems, Inc.
One or More Wireless-G Range Expander Have Been Found!
3
Please select the Wireless-G Range Expander you wish to configure. Click Yes to configure the Network Address Settings of the Wireless-G Range Expander. If you do not want to continue please click No.
Selection
linksysR600400
Status
MAC Address 00-90-4C-60-04-00
SSID linksysR600400
Channel Channel 6
WEP (Security) Disabled
Range Expander Name Linksys WRE54G
Click Yes if you want to change any of these settings or No if you want to keep these settings.
No Yes
Wireless-G Range Expander Setup Wizard Model No. WRE54G

Figure 5-7: Choose the Range Expander

6. When you have selected the Range Expander, you will be asked to enter its password. If you have not already set a password, you can type in the default password: **admin**. Then, click **Enter** to continue. To exit this Setup Wizard, click **Exit**.

PASSWORD
Password
The default password is admin. You will use this password later to access the Web-Based Utility or the next time you use this Setup Wizard. For enhanced security, change this password through the Web-Based Utility's Password page.
Exit Enter

Figure 5-8: The Password request screen

7. The Security Settings screen will appear next, if you have not entered this information already. From this screen, you can set the level of encryption on your network, along with entering the appropriate passphrases and/or encryption keys.

   If your network's WEP encryption uses a passphrase, enter it here. The passphrase can consist of no more than 16 alphanumeric characters.

   When entering the WEP key directly, it should be no more than 10 hexadecimal characters in length for 64-bit encryption or 26 hexadecimal characters in length for 128-bit encryption. Hexadecimal characters are the letters "A" through "F" and the numbers "0" through "9". All points in your wireless network must use the same WEP key to utilize WEP encryption.

   Click the **Next** button to continue or **Exit** to exit the Setup Wizard.

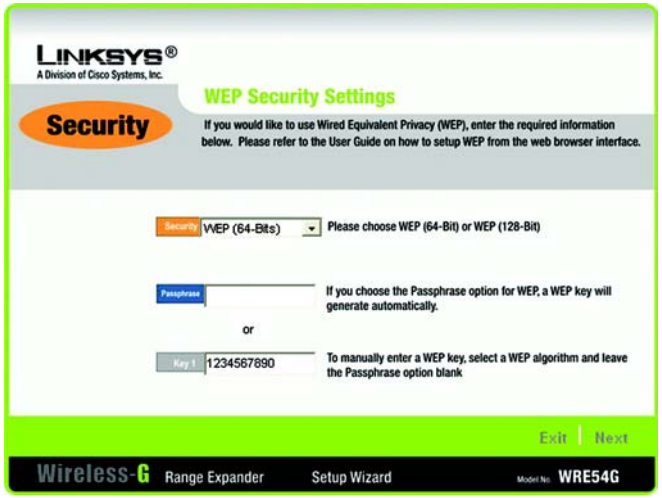
LINKSYS®
A Division of Cisco Systems, Inc.
Security
WEP Security Settings
If you would like to use Wired Equivalent Privacy (WEP), enter the required information below. Please refer to the User Guide on how to setup WEP from the web browser interface.
Security
WEP (64-Bits)
Please choose WEP (64-Bit) or WEP (128-Bit)
Passphrase
If you choose the Passphrase option for WEP, a WEP key will generate automatically.
or
Key 1
1234567890
To manually enter a WEP key, select a WEP algorithm and leave the Passphrase option blank
Exit
Next
Wireless-G
Range Expander
Setup Wizard
Model No.
WRE54G

Figure 5-9: The Security Settings screen

bit - *a binary digit.*

8. The Configure Network Address Settings screen will appear next. Enter an IP Address, Subnet Mask, the IP Address of your network Gateway, and an Expander Name. Then, click the **Next** button to continue or **Back** to return to the previous page.

   - IP Address. This IP address must be unique to your network. (The default IP address is 192.168.1.240.)
   - Subnet Mask. The Range Expander's Subnet Mask must be the same as your network.
   - Gateway. This IP address should be the IP address of the gateway device that allows for contact between the Internet and the local network.
   - Expander Name. You can assign the Range Expander any name up to 32 characters in length, such as its location (garage, downstairs, living room, etc.).

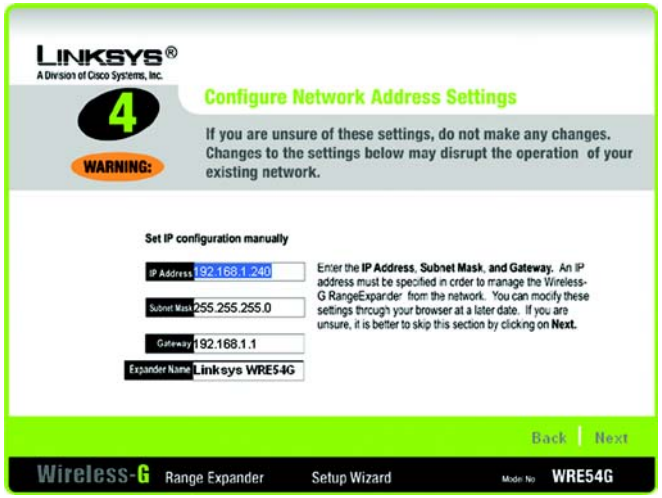
LINKSYS®
A Division of Cisco Systems, Inc.
4
Configure Network Address Settings
WARNING:
If you are unsure of these settings, do not make any changes. Changes to the settings below may disrupt the operation of your existing network.
Set IP configuration manually
IP Address
192.168.1.240
Subnet Mask
255.255.255.0
Gateway
192.168.1.1
Expander Name
Linksys WRE54G
Enter the IP Address, Subnet Mask, and Gateway. An IP address must be specified in order to manage the Wireless-G RangeExpander from the network. You can modify these settings through your browser at a later date. If you are unsure, it is better to skip this section by clicking on Next.
Back
Next
Wireless-G
Range Expander
Setup Wizard
Model No.
WRE54G

Figure 5-10: The Configure Network Address Settings screen

gateway - a device that interconnects networks with different, incompatible communications protocols.

9. You should now review the settings you've chosen. If these settings are correct, click the **Yes** button to save these settings. If you wish to change any of the settings, click the **No** button. You will exit the Setup Wizard and can start it again to revise your settings.

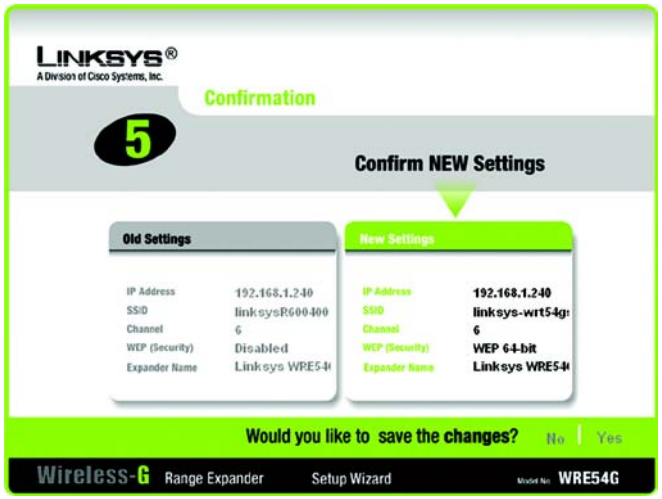

Figure 5-11: The Confirm New Settings screen

10. At this point, the configuration performed with the Setup Wizard is complete. To configure any other Range Expanders in your network, you can run this Setup Wizard again. Click the **Exit** button to exit the Setup Wizard.

Figure 5-12: The Congratulations screen

Chapter 6: Configuring the Wireless-G Range Expander

Overview

The Range Expander has been designed to be functional right out of the box, setting it up with the Auto configuration button or with the Setup Wizard. However, if you'd like to change these settings, the Range Expander can be configured through your web browser with the Web-Based Utility. This chapter explains how to configure the Range Expander in this manner.

Have You: Enabled TCP/IP on your PCs? PCs communicate over the network with this protocol. Refer to Appendix D: Windows Help for more information on TCP/IP.

Note: The Range Expander is designed to function properly after using the Auto configuration button or Setup Wizard. This chapter is provided solely for those who wish to perform more advanced configuration or monitoring.

Open your web browser and type the IP Address you entered in the Setup Wizard. (If you used the Auto configuration button, the default IP address is 192.168.1.240.) Press the **Enter** key and the Password Screen will appear. Leave the User Name field blank. The first time you open the Web-Based Utility, use the default password **admin**. You can set a new password from the Password tab.

Figure 6-1: Password Screen

browser: *an application program that provides a way to look at and interact with all the information on the World Wide Web.*

ip address: *the address used to identify a computer or device on a network.*

The Setup Tab

Basic Setup

The first screen that appears displays the *Basic Setup* screen. This allows you to change the Range Expander's general settings. Change these settings as described here and click **Save Settings** to apply your changes or **Cancel Changes** to cancel your changes. If you require online help, click **Help**.

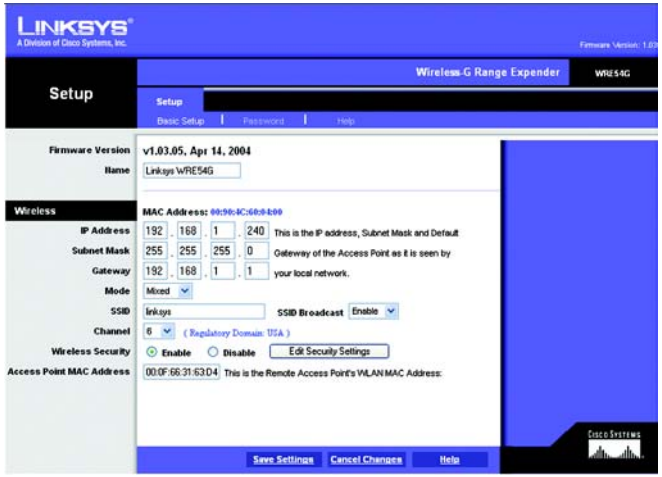

Figure 6-2: Setup Tab - Basic Setup

- **Firmware**. This will display the Range Expander's current firmware version. Firmware can be upgraded from the Help tab.

firmware: *the programming code that runs a networking device*

- **Name**. You may assign any name to the Range Expander. Unique, memorable names are helpful, especially if you are employing multiple Range Expanders on the same network. Verify this is the name you wish to use and click **Save Settings** to set it.

Wireless

The selections under this heading allow you to configure the Range Expander's connection to your wireless network.

- **IP Address**. The IP address must be unique to your network. We suggest you use the default IP address of 192.168.1.240.

subnet mask: *an address code that determines the size of the network.*

- **Subnet Mask**. The Subnet Mask must be the same as that set on your wireless network.

static ip address: *a fixed address assigned to a computer or device that is connected to a network*

- **Gateway**. If you have assigned a static IP address to the access point, then enter the IP address of your network's Gateway, such as a router, in the Gateway field. If your network does not have a Gateway, then leave this field blank.

- **Mode**. Select **Mixed** and both Wireless-G and Wireless-B computers will be allowed on the network, but the speed will be reduced. Select **G-Only** for maximum speed with Wireless-G products only. The final selection, **B-Only**, allows only Wireless-B products on the network.

- **SSID**. The SSID is the name shared among all points in a wireless network. The SSID must be identical for all points in the wireless network. It is case-sensitive and must not exceed 32 alphanumeric characters, which may be any keyboard character. Make sure this setting is the same for all points in your wireless network. For added security, you should change the SSID from the default name, **linksys**, to a unique name.

- **SSID Broadcast**. Allows the SSID to be broadcast on your network. You may want to enable this function while configuring your network, but make sure that you disable it when you are finished. With this enabled,

someone could easily obtain the SSID information with site survey software and gain unauthorized access to your network. Click **Enable** to broadcast the SSID to all wireless devices in range. Click **Disable** to increase network security and prevent the SSID from being seen on networked PCs.

- **Channel**. Select the appropriate channel from the list provided, between 1 and 11, to correspond with your network settings. All points in your wireless network must use the same channel to function correctly.

- **Wireless Security**. To enable wireless security, through WEP encryption, select the **Enable** radio button. To disable such security, select the radio button by **Disable**. To change the security settings to match your network, click the **Edit Security Settings** button. A notification window will ask if you wish to change the settings. Clicking the **Edit Security Settings** button will open the following options:

  Default Transmit Key. When using WEP keys and not a Passphrase (described below), this selection corresponds with the Key used.

  WEP Encryption. Select the level of WEP encryption you wish to use, 64-bit 10 hex digits or 128-bit 26 hex digits. Higher encryption levels offer higher levels of security, but due to the complexity of the encryption, they may decrease network performance.

  Passphrase. Instead of manually entering WEP keys, you can enter a Passphrase. This Passphrase is used to generate one or more WEP keys. It is case-sensitive and should not be longer than 16 alphanumeric characters. (This Passphrase function is compatible with Linksys wireless products only. If you want to communicate with non-Linksys wireless products, enter the WEP key manually on the non-Linksys wireless products.) After you enter the Passphrase, click the **Generate** button to create WEP keys.

  Keys 1-4. WEP keys enable you to create an encryption scheme for wireless transmissions. If you are not using a Passphrase, then manually enter a set of values. (Do not leave a key field blank, and do not enter all zeroes. These are not valid key values.)

  If you are using 64-bit WEP encryption, then the key must be exactly 10 hexadecimal characters in length. If you are using 128-bit WEP encryption, then the key must be exactly 26 hexadecimal characters in length. Valid hexadecimal characters are “0”-“9” and “A”-“F”.

- When finished making your changes on this tab, click the **Save Settings** button to save these changes, or click the **Cancel Changes** button to undo your changes.

- **Access Point MAC Address.** In this field, enter the MAC Address of the access point with which the Range Expander is communicating.

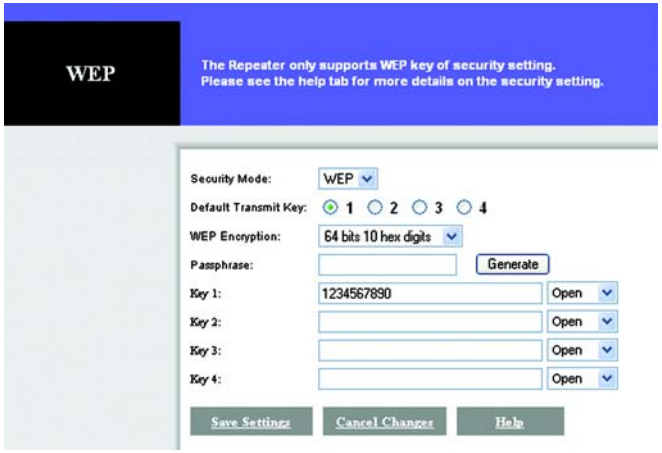

Figure 6-3: WEP Security screen

encryption: *encoding data transmitted in a network*

software: *instructions for the computer.*

passphrase: *used much like a password, a passphrase simplifies the WEP encryption process by automatically generating the WEP encryption keys for Linksys products.*

MAC address: *the unique address that a manufacturer assigns to each networking device.*

Password

The Password screen allows you to change the Range Expander's password and restore factory defaults.

Changing the sign-on password for the Range Expander is as easy as typing the password into the **Password** field. Then, type it again into the second field to confirm.

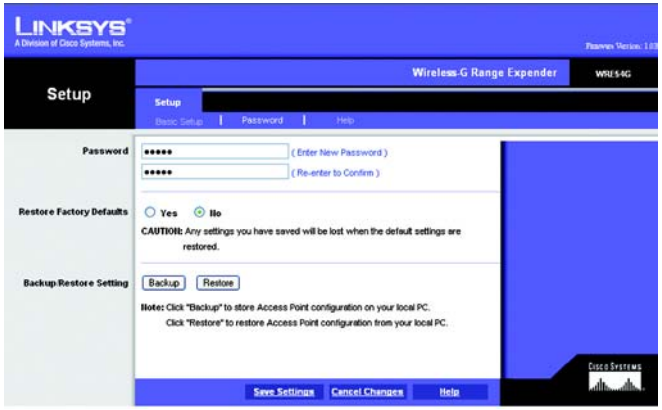

Figure 6-4: Setup Tab - Password

To restore the Range Expander's factory default settings, click the **Yes** button beside Restore Factory Defaults.Then, click the **Save Settings** button.

To back up your Range Expander configuration, click the **Backup** button. A File Download screen will appear and you can click Save to backup the file to your PC. To restore the backed-up configuration, click the **Restore** button and select it from the same location.

IMPORTANT: Restoring the Range Expander's factory default settings will erase all of your Wireless and WEP settings, and replace them with the factory defaults. Do not reset the Range Expander if you want to retain these settings.

download: *to receive a file transmitted over a network*

Click the **Save Settings** button to apply your changes or **Cancel Changes** to cancel your changes. If you require online help, click the **Help** button.

File Download
Some files can harm your computer. If the file information below looks suspicious, or you do not fully trust the source, do not open or save this file.
File name: config.bin
File type:
From: 192.168.1.240
Would you like to open the file or save it to your computer?
Open
Save
Cancel
More Info
Always ask before opening this type of file

Figure 6-5: File Download

Help

For help on the various tabs in this Web-based Utility, along with upgrading the Range Expander's firmware and viewing this User Guide, click the *Help* tab.

The help files for the various tabs in this Web-based Utility are listed by tab name on the left hand side of the screen.

Click the *Linksys Website* link to connect to the Linksys homepage for Knowledgebase help files and information about other Linksys products, provided you have an active Internet connection.

For an Online manual in PDF format, click that text link. (You're viewing it right now!) The User Guide will appear in Adobe pdf format. If you do not have the Adobe PDF Reader installed on your computer, click the **Adobe Website** link or go to the Setup Wizard CD-ROM to download this software. (To access the Adobe website, you will need an active Internet connection.) To download from the CD-ROM, click the **Start** button and select **Run**. Type **D:\Acrobat** (if "D" is the letter of your CD-ROM drive).

New firmware versions are posted at www.linksys.com and can be downloaded for free. If the Range Expander is not experiencing difficulties, then there is no need to download a more recent firmware version, unless that version has a new feature that you want to use. Loading new firmware does not always enhance the speed or quality of your Internet connection.

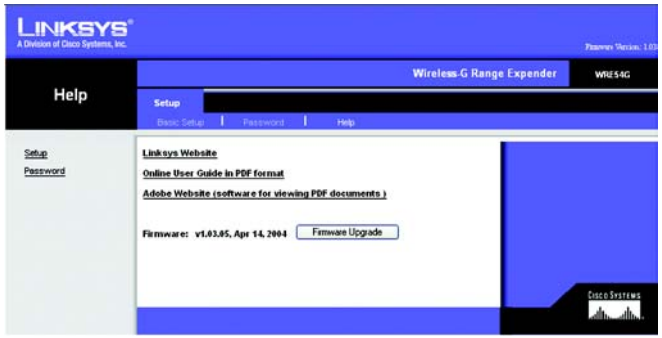

Figure 6-6: Setup Tab - Help

To upgrade the Range Expander's firmware:

1. Download the firmware upgrade file from the Linksys website.
2. Extract the firmware upgrade file.
3. Click the **Upgrade Firmware** button on the Help screen.
4. Enter the location of the firmware upgrade file in the File Path field, or click the **Browse** button to find the firmware upgrade file.
5. Double-click the firmware upgrade file.

Click the **Upgrade** button, and follow the on-screen instructions.

Upgrade Firmware - Microsoft Internet Explorer
Firmware Upgrade
File Path:
Browse...
Upgrade
Cancel
Help
Warning: Upgrading firmware may take a few minutes, please don't turn off the power or press the reset button.

Figure 6-7: Firmware Upgrade

upgrade: *to replace existing software or firmware with a newer version.*

Appendix A: Troubleshooting

This appendix consists of two parts: "Common Problems and Solutions" and "Frequently Asked Questions." This appendix provides solutions to problems that may occur during the installation and operation of the Wireless-G Range Expander. Read the description below to solve your problems. If you can't find an answer here, check the Linksys website at *www.linksys.com*.

Common Problems and Solutions

1. ***The Wireless-G Range Expander will not connect to my Wireless-G network.***
   Go through this checklist:
   - Verify that your PC can communicate with your wireless network.
   - Press the Range Expander's reset button (with a pin or a pen) for five seconds. This should reset the Range Expander's settings back to their default.
   - Disconnect the Range Expander's power for 30 seconds. Then, connect the power again.
   - Press the Auto configuration button on the side of the Range Expander. As long as it is within range of an access point or wireless router that has disabled WEP, it should communicate with it.

2. ***The Setup Wizard does not detect the Range Expander.***
   Go through this checklist:
   - Press the Range Expander's reset button (with a pin or a pen) for five seconds. This should reset the Range Expander's settings back to their default.
   - Disconnect the Range Expander's power for 30 seconds. Then, connect the power again.

Frequently Asked Questions

Can I run an application from a remote computer over the wireless network?

This will depend on whether or not the application is designed to be used over a network. Consult the application's user guide to determine if it supports operation over a network.

Can I play multiplayer games with other users of the wireless network?

Yes, as long as the game supports multiple players over a network. Refer to the game's user guide for more information.

What IEEE 802.11b features are supported?

The product supports the following IEEE 802.11 functions:

•CSMA/CA plus Acknowledge protocol

- Multi-Channel Roaming
- Automatic Rate Selection
- RTS/CTS feature
- Fragmentation
- Power Management

What is Ad-hoc?

An Ad-hoc wireless network is a group of computers, each with a wireless adapter, connected as an independent wireless network. An Ad-hoc wireless network is applicable at a departmental scale for a branch or SOHO operation.

What is Infrastructure?

An integrated wireless and wired network is called an Infrastructure configuration. Infrastructure is applicable to enterprise scale for wireless access to a central database, or wireless application for mobile workers.

What is Roaming?

Roaming is the ability of a portable computer user to communicate continuously while moving freely throughout an area greater than that covered by a single access point. Before using the roaming function, the workstation must make sure that it is the same channel number as the network within the coverage area.

To achieve true seamless connectivity, the wireless network must incorporate a number of different functions. Each node, for example, must always acknowledge receipt of each message. Each node must maintain contact with the wireless network even when not actually transmitting data. Achieving these functions simultaneously requires a dynamic RF networking technology that links nodes. In such a system, the user's end node undertakes a search for the best possible access to the system. First, it evaluates such factors as signal strength and quality, as well as the message load currently being carried in the network. Based on that information, the node next selects the right access point and registers its address. Communications between end node and host computer can then be transmitted up and down the backbone.

As the user moves on, the end node's RF transmitter regularly checks the system to determine whether it is in touch with the original access point or whether it should seek a new one. When a node no longer receives acknowledgment from its original access point, it undertakes a new search. Upon finding a new access point, it then re-registers, and the communication process continues.

What is ISM band?

The FCC and their counterparts outside of the U.S. have set aside bandwidth for unlicensed use in the ISM (Industrial, Scientific and Medical) band. Spectrum in the vicinity of 2.4 GHz, in particular, is being made available worldwide. This presents a truly revolutionary opportunity to place convenient high speed wireless capabilities in the hands of users around the globe.

What is Spread Spectrum?

Spread Spectrum technology is a wideband radio frequency technique developed by the military for use in reliable, secure, mission-critical communications systems. It is designed to trade off bandwidth efficiency for reliability, integrity, and security. In other words, more bandwidth is consumed than in the case of narrowband transmission, but the trade-off produces a signal that is, in effect, louder and thus easier to detect, provided that the receiver knows the parameters of the spread-spectrum signal being broadcast. If a receiver is not tuned to the right frequency, a spread-spectrum signal looks like background noise. There are two main alternatives, Direct Sequence Spread Spectrum (DSSS) and Frequency Hopping Spread Spectrum (FHSS).

What is DSSS? What is FHSS? And what are their differences?

Frequency Hopping Spread Spectrum (FHSS) uses a narrowband carrier that changes frequency in a pattern that is known to both transmitter and receiver. Properly synchronized, the net effect is to maintain a single logical channel. To an unintended receiver, FHSS appears to be short-duration impulse noise. Direct Sequence Spread Spectrum (DSSS) generates a redundant bit pattern for each bit to be transmitted. This bit pattern is called a chip (or chipping code). The longer the chip, the greater the probability that the original data can be recovered. Even if one or more bits in the chip are damaged during transmission, statistical techniques embedded in the radio can recover the original data without the need for retransmission. To an unintended receiver, DSSS appears as low power wideband noise and is rejected (ignored) by most narrowband receivers.

Would the information be intercepted while transmitting on air?

Wireless networks feature two-fold protection. On the hardware side, as with Direct Sequence Spread Spectrum technology, it has the inherent security feature of scrambling. On the software side, the wireless series offers the encryption function (WEP) to enhance security and access control. Users can set it up depending upon their needs.

Can Linksys Wireless products support file and printer sharing?

Linksys Wireless products can work with Netware, Windows NT/2000, or other operating systems to support printer or file sharing.

What is WEP?

WEP is Wired Equivalent Privacy, a data privacy mechanism based on a 40-bit shared-key algorithm, as described in the IEEE 802.11 standard.

What is a MAC Address?

The Media Access Control (MAC) address is a unique number assigned by the manufacturer to any networking device, such as a network adapter, that allows the network to identify it at the hardware level. For all practical purposes, this number is usually permanent. Unlike IP addresses, which can change every time a computer logs on to the network, the MAC address of a device stays the same, making it a valuable identifier for the network.

How do I avoid interference?

Using multiple access points on the same channel and in close proximity to one another will generate interference. When employing multiple access points, be sure to operate each one on a different channel (frequency).

How do I reset the Range Expander?

Press the Reset button on the back of the Range Expander for about ten seconds. This will reset the unit to its default settings.

How do I resolve issues with signal loss?

There is no way to know the exact range of your wireless network without testing. Every obstacle placed between points in a network will create signal loss. Leaded glass, metal, concrete floors, water and walls will inhibit the signal and reduce range. Start with your access point and your wireless PC in the same room and move it away in small increments to determine the maximum range in your environment.

You may also try using different channels, as this may eliminate interference affecting only one channel. Also, due to FCC regulations, more power may be transmitted, using 802.11a, on channels 52, 56, 60 and 64, than on the lower channels. Lastly, check the Advanced tab of the Web-Based Utility and make sure that FULL is selected in the Transmission Rate field.

Appendix B: Wireless Security

Linksys wants to make wireless networking as safe and easy for you as possible. The current generation of Linksys products provide several network security features, but they require specific action on your part for implementation. So, keep the following in mind whenever you are setting up or using your wireless network.

Security Precautions

The following is a complete list of security precautions to take (as shown in this User Guide) (at least steps 1 through 5 should be followed):

1. Change the default SSID.
2. Disable SSID Broadcast.
3. Change the default password for the Administrator account.
4. Enable MAC Address Filtering.
5. Change the SSID periodically.
6. Use the highest encryption algorithm possible. Use WPA if it is available. Please note that this may reduce your network performance.
7. Change the WEP encryption keys periodically.

To ensure network security, steps one through five should be followed, at least.

Note: Some of these security features are available only through the network router or access point. Refer to the router or access point's documentation for more information.

Security Threats Facing Wireless Networks

Wireless networks are easy to find. Hackers know that in order to join a wireless network, wireless networking products first listen for "beacon messages". These messages can be easily decrypted and contain much of the network's information, such as the network's SSID (Service Set Identifier). Here are the steps you can take:

Change the administrator's password regularly. With every wireless networking device you use, keep in mind that network settings (SSID, WEP keys, etc.) are stored in its firmware. Your network administrator is the only person who can change network settings. If a hacker gets a hold of the administrator's password, he, too, can change those settings. So, make it harder for a hacker to get that information. Change the administrator's password regularly.

SSID. There are several things to keep in mind about the SSID:

1. Disable Broadcast
2. Make it unique
3. Change it often

Most wireless networking devices will give you the option of broadcasting the SSID. While this option may be more convenient, it allows anyone to log into your wireless network. This includes hackers. So, don't broadcast the SSID.

Wireless networking products come with a default SSID set by the factory. (The Linksys default SSID is "linksys".) Hackers know these defaults and can check these against your network. Change your SSID to something unique and not something related to your company or the networking products you use.

Change your SSID regularly so that any hackers who have gained access to your wireless network will have to start from the beginning in trying to break in.

MAC Addresses. Enable MAC Address filtering. MAC Address filtering will allow you to provide access to only those wireless nodes with certain MAC Addresses. This makes it harder for a hacker to access your network with a random MAC Address.

WEP Encryption. Wired Equivalent Privacy (WEP) is often looked upon as a cure-all for wireless security concerns. This is overstating WEP's ability. Again, this can only provide enough security to make a hacker's job more difficult.

There are several ways that WEP can be maximized:

1. Use the highest level of encryption possible
2. Use "Shared Key" authentication
3. Change your WEP key regularly

WPA. Wi-Fi Protected Access (WPA) is the newest and best available standard in Wi-Fi security. Two modes are available: Pre-Shared Key and RADIUS. Pre-Shared Key gives you a choice of two encryption methods: TKIP (Temporal Key Integrity Protocol), which utilizes a stronger encryption method and incorporates Message Integrity Code (MIC) to provide protection against hackers, and AES (Advanced Encryption System), which utilizes a symmetric 128-Bit block data encryption. RADIUS (Remote Authentication Dial-In User Service) utilizes a RADIUS server for authentication and the use of dynamic TKIP, AES, or WEP.

Important: Always remember that each device in your wireless network MUST use the same encryption method and encryption key or your wireless network will not function properly.

WPA Pre-Shared Key. If you do not have a RADIUS server, select the type of algorithm, TKIP or AES, enter a password in the Pre-Shared key field of 8-64 characters, and enter a Group Key Renewal period time between 0 and 99,999 seconds, which instructs the Router or other device how often it should change the encryption keys.

WPA RADIUS. WPA used in coordination with a RADIUS server. (This should only be used when a RADIUS server is connected to the Router or other device.) First, select the type of WPA algorithm, **TKIP** or **AES**. Enter the RADIUS server's IP Address and port number, along with a key shared between the device and the server. Last, enter a Group Key Renewal period, which instructs the device how often it should change the encryption keys.

RADIUS. WEP used in coordination with a RADIUS server. (This should only be used when a RADIUS server is connected to the Router or other device.) First, enter the RADIUS server's IP Address and port number, along with a key shared between the device and the server. Then, select a WEP key and a level of WEP encryption, and either generate a WEP key through the Passphrase or enter the WEP key manually.

Implementing encryption may have a negative impact on your network's performance, but if you are transmitting sensitive data over your network, encryption should be used.

These security recommendations should help keep your mind at ease while you are enjoying the most flexible and convenient technology Linksys has to offer.

Appendix C: Upgrading Firmware

The Range Expander's firmware is upgraded through the Web-Utility's Help tab. Follow these instructions:

1. Download the firmware from Linksys's website at **www.linksys.com**.
2. Click **Upgrade Firmware** from the Web-Utility's Help tab, and the *Upgrade Firmware* screen will appear.
3. Enter the location of the firmware's file or click the **Browse** button to find the file.
4. Then, click the **Upgrade** button to upgrade the firmware.

Upgrade Firmware - Microsoft Internet Explorer
Firmware Upgrade
File Path:
Browse...
Upgrade
Cancel
Help
Warning: Upgrading firmware may take a few minutes, please don't turn off the power or press the reset button.

Figure C-1: Upgrade Firmware

Appendix D: Windows Help

All wireless products require Microsoft Windows. Windows is the most used operating system in the world and comes with many features that help make networking easier. These features can be accessed through Windows Help and are described in this appendix.

TCP/IP

Before a computer can communicate within a network, TCP/IP must be enabled. TCP/IP is a set of instructions, or protocol, all PCs follow to communicate over a network. This is true for wireless networks as well. Your PCs will not be able to utilize wireless networking without having TCP/IP enabled. Windows Help provides complete instructions on enabling TCP/IP.

Shared Resources

If you wish to share printers, folder, or files over your network, Windows Help provides complete instructions on utilizing shared resources.

Network Neighborhood/My Network Places

Other PCs on your network will appear under Network Neighborhood or My Network Places (depending upon the version of Windows you're running). Windows Help provides complete instructions on adding PCs to your network.

Appendix E: Glossary

802.11b - An IEEE wireless networking standard that specifies a maximum data transfer rate of 11Mbps and an operating frequency of 2.4GHz.

802.11g - An IEEE wireless networking standard that specifies a maximum data transfer rate of 54Mbps, an operating frequency of 2.4GHz, and backward compatibility with 802.11b devices.

Access Point - A device that allows wireless-equipped computers and other devices to communicate with a wired network. Also used to expand the range of a wireless network.

Adapter - A device that adds network functionality to your PC.

Ad-hoc - A group of wireless devices communicating directly with each other (peer-to-peer) without the use of an access point.

AES (**A**dvanced **E**ncryption **S**tandard) - A method that uses up to 256-bit key encryption to secure data.

Backbone - The part of a network that connects most of the systems and networks together, and handles the most data.

Bandwidth - The transmission capacity of a given device or network.

Bit - A binary digit.

Bridge - A device that connects different networks.

Browser - An application program that provides a way to look at and interact with all the information on the World Wide Web.

CSMA/CA (**C**arrier **S**ense **M**ultiple **A**ccess/**C**ollision **A**voidance) - A method of data transfer that is used to prevent data collisions.

CTS (**C**lear **T**o **S**end) - A signal sent by a wireless device, signifying that it is ready to receive data.

Database - A collection of data that is organized so that its contents can easily be accessed, managed, and updated.

Download - To receive a file transmitted over a network.

DSSS (**D**irect-**S**equence **S**pread-**S**pectrum) - Frequency transmission with a redundant bit pattern resulting in a lower probability of information being lost in transit.

Encryption - Encoding data transmitted in a network.

Firmware - The programming code that runs a networking device.

Fragmentation -Breaking a packet into smaller units when transmitting over a network medium that cannot support the original size of the packet.

Gateway - A device that interconnects networks with different, incompatible communications protocols.

Hardware - The physical aspect of computers, telecommunications, and other information technology devices.

IEEE (The **I**nstitute of **E**lectrical and **E**lectronics **E**ngineers) - An independent institute that develops networking standards.

Infrastructure - A wireless network that is bridged to a wired network via an access point.

IP (**I**nternet **P**rotocol) - A protocol used to send data over a network.

IP Address - The address used to identify a computer or device on a network.

ISM band - Radio bandwidth utilized in wireless transmissions.

MAC (**M**edia **A**ccess **C**ontrol) **Address** - The unique address that a manufacturer assigns to each networking device.

Network - A series of computers or devices connected for the purpose of data sharing, storage, and/or transmission between users.

Node - A network junction or connection point, typically a computer or work station.

Packet - A unit of data sent over a network.

Passphrase - Used much like a password, a passphrase simplifies the WEP encryption process by automatically generating the WEP encryption keys for Linksys products.

Port - The connection point on a computer or networking device used for plugging in cables or adapters.

RADIUS (**R**emote **A**uthentication **D**ial-**I**n **U**ser **S**ervice) - A protocol that uses an authentication server to control network access.

Roaming - The ability to take a wireless device from one access point's range to another without losing the connection.

Router - A networking device that connects multiple networks together.

RTS (**R**equest **T**o **S**end) - A networking method of coordinating large packets through the RTS Threshold setting.

Server - Any computer whose function in a network is to provide user access to files, printing, communications, and other services.

Software - Instructions for the computer. A series of instructions that performs a particular task is called a "program".

SOHO (**S**mall **O**ffice/**H**ome **O**ffice) - Market segment of professionals who work at home or in small offices.

Spread Spectrum - Wideband radio frequency technique used for more reliable and secure data transmission.

SSID (**S**ervice **S**et **ID**entifier) - Your wireless network's name.

Static IP Address - A fixed address assigned to a computer or device that is connected to a network.

Subnet Mask - An address code that determines the size of the network.

TCP (**T**ransmission **C**ontrol **P**rotocol) - A network protocol for transmitting data that requires acknowledgement from the recipient of data sent.

TCP/IP (**T**ransmission **C**ontrol **P**rotocol/**I**nternet **P**rotocol) - A set of instructions PCs use to communicate over a network.

TKIP (**T**emporal **K**ey **I**ntegrity **P**rotocol) - a wireless encryption protocol that provides dynamic encryption keys for each packet transmitted.

Topology - The physical layout of a network.

Upgrade - To replace existing software or firmware with a newer version.

WEP (**W**ired **E**quivalent **P**rivacy) - A method of encrypting network data transmitted on a wireless network for greater security.

WPA (**W**i-Fi **P**rotected **A**ccess) - a wireless security protocol using TKIP (Temporal Key Integrity Protocol) encryption, which can be used in conjunction with a RADIUS server.

Appendix F: Specifications

Standards	IEEE 802.11g, IEEE 802.11b
Buttons	Auto configuration/Mode, Reset
LEDs	Link (Red/Blue), Activity (Blue)
Transmit Power	802.11g: Typ. 13±1 1dBm @ Normal Temp Range
	802.11b: Typ: 15±l 1dBm @ Normal Temp Range"
Security features	WEP
WEP key bits	64/128
Dimensions (W x H x D)	3.18" x 8.27" x 1.77" (80.7 mm x 210 mm x 45 mm)
Power	Input: 115-230V AC 0.2A, Output: 3.3V DC 1.5A
Certification	FCC, CE, UL
Operating Temp.	0ºC to 40ºC (32ºF to 150ºF)
Storage Temp.	0ºC to 70ºC (-40ºF to 185ºF)
Operating Humidity	10% to 85%, Non-Condensing
Storage Humidity	5% to 90% Non-Condensing

Appendix G: Warranty Information

LIMITED WARRANTY

Linksys warrants to You that, for a period of three years (the “Warranty Period”), your Linksys Product will be substantially free of defects in materials and workmanship under normal use. Your exclusive remedy and Linksys' entire liability under this warranty will be for Linksys at its option to repair or replace the Product or refund Your purchase price less any rebates. This limited warranty extends only to the original purchaser.

If the Product proves defective during the Warranty Period call Linksys Technical Support in order to obtain a Return Authorization Number, if applicable. BE SURE TO HAVE YOUR PROOF OF PURCHASE ON HAND WHEN CALLING. If You are requested to return the Product, mark the Return Authorization Number clearly on the outside of the package and include a copy of your original proof of purchase. RETURN REQUESTS CANNOT BE PROCESSED WITHOUT PROOF OF PURCHASE. You are responsible for shipping defective Products to Linksys. Linksys pays for UPS Ground shipping from Linksys back to You only. Customers located outside of the United States of America and Canada are responsible for all shipping and handling charges.

ALL IMPLIED WARRANTIES AND CONDITIONS OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED TO THE DURATION OF THE WARRANTY PERIOD. ALL OTHER EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF NON-INFRINGEMENT, ARE DISCLAIMED. Some jurisdictions do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to You. This warranty gives You specific legal rights, and You may also have other rights which vary by jurisdiction.

This warranty does not apply if the Product (a) has been altered, except by Linksys, (b) has not been installed, operated, repaired, or maintained in accordance with instructions supplied by Linksys, or (c) has been subjected to abnormal physical or electrical stress, misuse, negligence, or accident. In addition, due to the continual development of new techniques for intruding upon and attacking networks, Linksys does not warrant that the Product will be free of vulnerability to intrusion or attack.

TO THE EXTENT NOT PROHIBITED BY LAW, IN NO EVENT WILL LINKSYS BE LIABLE FOR ANY LOST DATA, REVENUE OR PROFIT, OR FOR SPECIAL, INDIRECT, CONSEQUENTIAL, INCIDENTAL OR PUNITIVE DAMAGES, REGARDLESS OF THE THEORY OF LIABILITY (INCLUDING NEGLIGENCE), ARISING OUT OF OR RELATED TO THE USE OF OR INABILITY TO USE THE PRODUCT (INCLUDING ANY SOFTWARE), EVEN IF LINKSYS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT WILL LINKSYS’ LIABILITY EXCEED THE AMOUNT PAID BY YOU FOR THE PRODUCT. The foregoing limitations will apply even if any warranty or remedy provided under this Agreement fails of its essential purpose. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to You.

Please direct all inquiries to: Linksys, P.O. Box 18558, Irvine, CA 92623.

Appendix H: Regulatory Information

FCC STATEMENT

This product has been tested and complies with the specifications for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used according to the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which is found by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna

Increase the separation between the equipment or devices

Connect the equipment to an outlet other than the receiver's

Consult a dealer or an experienced radio/TV technician for assistance

FCC Radiation Exposure Statement
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

INDUSTRY CANADA (CANADA)

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.
The use of this device in a system operating either partially or completely outdoors may require the user to obtain a license for the system according to the Canadian regulations.

EC DECLARATION OF CONFORMITY (EUROPE)

Linksys declares that this product conforms to the specifications listed below, following the provisions of the European R&TTE directive 1999/5/EC:

EN 301 489-1, 301 489-17 General EMC requirements for Radio equipment.

EN 609 50 Safety

EN 300-328-1, EN 300-328-2 Technical requirements for Radio equipment.

Caution: This equipment is intended to be used in all EU and EFTA countries. Outdoor use may be restricted to certain frequencies and/or may require a license for operation. Contact local Authority for procedure to follow.

Note: Combinations of power levels and antennas resulting in a radiated power level of above 100 mW equivalent isotropic radiated power (EIRP) are considered as not compliant with the above mentioned directive and are not allowed for use within the European community and countries that have adopted the European R&TTE directive 1999/5/EC.

For more details on legal combinations of power levels and antennas, contact Linksys Corporate Compliance.

Linksys vakuuttaa täten että dieses produkt tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien näiden direktiivien muiden ehtojen mukainen.

Linksys Group déclare que le produit est conforme aux conditions essentielles et aux dispositions relatives à la directive 1999/5/EC.

Belgique:

Dans le cas d'une utilisation privée, à l'extérieur d'un bâtiment, au-dessus d'un espace public, aucun enregistrement n'est nécessaire pour une distance de moins de 300m. Pour une distance supérieure à 300m un enregistrement auprès de l'IBPT est requise. Pour une utilisation publique à l'extérieur de bâtiments, une licence de l'IBPT est requise. Pour les enregistrements et licences, veuillez contacter l'IBPT.

France:

2.4 GHz Bande : les canaux 10, 11, 12, 13 (2457, 2462, 2467, et 2472 MHz respectivement) sont complétement libres d'utilisation en France (en utilisation intérieur). Pour ce qui est des autres canaux, ils peuvent être soumis à autorisation selon le département. L'utilisation en extérieur est soumis à autorisation préalable et très restreint.

Vous pouvez contacter l'Autorité de Régulation des Télécommunications (http://www.art-telecom.fr) pour de plus amples renseignements.

SAFETY NOTICES

Caution: To reduce the risk of fire, use only No.26 AWG or larger telecommunication line cord.

Do not use this product near water, for example, in a wet basement or near a swimming pool.
Avoid using this product during an electrical storm. There may be a remote risk of electric shock from lightning.

FCC PART 68 STATEMENT

This equipment complies with Part 68 of the FCC Rules. A label is attached to the equipment that contains, among other information, its FCC registration number and ringer equivalence number. If requested, this information must be provided to the telephone company.

This equipment uses the following USOC Jack: RJ-11.

An FCC compliant telephone cord and modular plug is provided with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using a compatible modular jack, which is FCC Part 68 compliant. Connection to the telephone network should be made by using the standard modular telephone jack.

The REN is useful to determine the quantity of devices that may be connected to the telephone line and still have all of those devices ring when your telephone number is called. In most, but not all areas, the sum of RENs should not exceed 5. To be certain of the number of devices that may be connected to the line, as determined by the total RENs, contact the telephone company to determine the maximum REN for the calling area.

If this equipment causes harm to the telephone network, the telephone company may discontinue your service temporarily. If advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make the necessary modifications in order to maintain uninterrupted service.

In the event this equipment should fail to operate properly, disconnect the unit from the telephone line. Try using another FCC approved device in the same telephone jack. If the trouble persists, call the telephone company repair service bureau. If the trouble does not persist and appears to be with this unit, disconnect the unit from the telephone line and discontinue use of the unit until it is repaired. Please note that the telephone company may ask that you disconnect the equipment from the telephone network until the problem has been corrected or until you are sure that the equipment is not malfunctioning. The user must use the accessories and cables supplied by the manufacturer to get optimum performance from the product.

No repairs may be done by the customer. If trouble is experienced with this equipment, please contact your authorized support provider for repair and warranty information. If the trouble is causing harm to the telephone network, the telephone company may request you remove the equipment from the network until the problem is resolved. This equipment cannot be used on telephone company provided coin service. Connection to Party Line Service is subject to state tariffs.

SAFETY NOTICES

Caution: To reduce the risk of fire, use only No.26 AWG or larger telecommunication line cord.

Do not use this product near water, for example, in a wet basement or near a swimming pool.

Avoid using this product during an electrical storm. There may be a remote risk of electric shock from lightning.

Appendix I: Contact Information

Need to contact Linksys? Visit us online for information on the latest products and updates to your existing products at:	http://www.linksys.com or ftp.linksys.com
Can't find information about a product you want to buy on the web? Do you want to know more about networking with Linksys products? Give our advice line a call at:	800-546-5797 (LINKSYS)
Or fax your request in to:	949-823-3002
If you experience problems with any Linksys product, you can call us at:	800-326-7114
Don't wish to call? You can e-mail us at:	support@linksys.com
If any Linksys product proves defective during its warranty period, you can call the Linksys Return Merchandise Authorization department for obtaining a Return Authorization Number at: (Details on Warranty and RMA issues can be found in the Warranty Information section in this Guide.)	949-823-3000

LINKSYS®

A Division of Cisco Systems, Inc.

2.4GHz 802.11g

Wireless-G

Range Expander

User Guide

WIRELESS

Model No. **WRE54G**

CISCO SYSTEMS